APPENDIX M

WILDLIFE HABITAT ANALYSES AND DEFINITIONS

Table M-1. Current Acreage of Various Habitat Types in the Project Area Among the Various WAAs

	WAAs						
Habitat Type	**Bear-Mattole River**	**Eel River**	**Humboldt Bay**	**Mad River**	**Van Duzen River**	**Yager Creek**	**Total**
LSH	6,840	26,899	21,309	157	6,250	7,019	**68,474**
Uncut Old Growth	3,268	1,023	3,157	0	137	1,728	**9,313**
Douglas-fir	3,268	683	0	0	5	216	**4,172**
Redwood	0	340	3,157	0	132	1,512	**5,141**
Residual Old Growth	2,093	6,253	2,743	151	1,795	3,875	**16,910**
Douglas-fir	2,055	2,089	5	151	19	113	**4,432**
Redwood	38	4,164	2,738	0	1,776	3,762	**12,478**
Late Seral	1,479	19,623	15,409	6	4,318	1,416	**42,251**
Mid-seral	18,669	24,191	13,359	3,367	13,796	9,606	**82,988**
Young Forest	2,360	14,918	8,366	0	3,237	15,543	**44,424**
Forest Open	1,302	5,478	2,526	0	703	975	**10,984**
Hardwood	487	740	158	89	62	27	**1,563**
Prairie	3,820	1,111	0	291	175	290	**5,687**
Other Non-timber	1,065	2,290	423	0	721	683	**5,182**
Total	**34,543**	**75,627**	**46,141**	**3,904**	**24,944**	**34,143**	**219,302**

Source: Foster Wheeler Environmental Corporation

Table M-2. Management Requirements for Non-Federal Lands That Provide Protection for Various Wildlife Resources in the Project Area

Issue	California FPR[1/]	PALCO SYP/HCP[2/]
LSH (including old-growth and late-seral forest)	• Mitigation and impacts must be described in THPs, SYPs, and Nonindustrial Timber Management Plans (NTMPs).	• Minimum of 10 percent of ownership within the LSH category during the life of the plan.
Wetland/ riparian habitat	• See riparian and wetland section.	• See riparian and wetland section.
Unique habitats (e.g., snags, cliff, etc.)	• Snags—All snags retained except the following: – Those within 100 feet of ridgetops suitable for fire suppression; – Those which pose a hazard and are within 100 feet of public roads, permanent roads, seasonal roads, landings, and railroads; – Those that require felling due to safety regulations; – Those within 100 feet of structure maintained for human habitation; – Merchantable snags as provided in THP; – Those removed for insect or disease control; – Those proposed for removal by the RPF with explanation. • Cliffs—Not specifically addressed. • Caves—Not specifically addressed. • Talus Slopes—Not specifically addressed.	• Snags (Interim Objectives): At a minimum, the following numbers of snags (conifer and hardwood) shall remain averaged over the THP area, following timber harvest and site preparation: 1.2/acre ≥ 30 inches dbh ≥ 30 feet tall 2.4/acre ≥ 20 inches dbh ≥ 16 feet tall 1.2/acre ≥ 15 inches dbh ≥12 feet tall – Retain all snags that do not constitute a safety hazard during timber harvest. – Larger snags may be substituted for smaller snags. – Snags in RMZs adjacent to harvest units may be counted toward the objective; but at least half the snags in each size category must be outside Class I and Class II RMZs. – If snags are not present to meet the above objective, green trees in the same size categories shall be retained in numbers sufficient to meet the objective. Conifer species other than redwood shall have priority for retention. Green trees identified as replacement trees for snags shall be retained during subsequent timber harvest entries through the permit term. – In the event of an emergency, as described in Section 1052.1 of the CFPR, such as wildfire, pest or disease outbreak, the requirement for retention of all snags may be waived through consultation with and approval by the FWS and the DFG. – Retain at least 4 live cull trees per acre outside of Class I and Class II RMZs that do not constitute a safety hazard. Trees ≥30 inches dbh, and trees with visible defects such as broken tops, deformities, or cavities will have priority for retention. Live cull trees may include trees with merchantable logs. These trees shall be retained during subsequent timber harvest entries through the permit term so long as they do not constitute a safety hazard. – All live hardwood trees over 30 inches dbh that do not constitute a safety hazard shall remain following timber harvest and site preparation, to a maximum of 2 per acre. Hardwoods within all RMZs count towards this objective. • Downed logs (Interim Objectives): Retain two logs per acre outside the Class I and II wetland and lake protection zone of any decay class ≥ 15 inches in diameter at the large end and ≥ 20 feet long. One of these logs per acre must be in decay class 1, 2, or 3 (Maser and Trapp, 1984). Hollow logs over 30 inches in diameter will have priority for retention. There will be no requirement to leave down logs where they do not exist currently until results of the first 5 years of monitoring have been evaluated. • Snag and down log conservation measures shall apply to timber harvest plans, timber harvest exemptions, and notice of emergency Timber Operations, and will be evaluated based on the average number measured over a 40-acre harvest unit. • Monitoring of snags and downed logs will occur as follows (see Appendix P for further detail): - Circular plots 0.01 acre or 0.1 acre in size will be used to monitor the snag and downed log conditions. - Different harvest units will be inventoried separately. - Progress will be measured by averaging green trees, snags, and downed logs per acre on THP units (and the associated riparian management zones). - After five years or sooner, following the next intensive inventory and measuring of these components, PALCO will reconvene with FWS and CDFG to evaluate the habitat components inventory and review other current literature on the subject. Comparison between existing condition and desired goals will be made. If warranted, revisions will be made to this management strategy. Following this initial evaluation, there will be a ten-year reporting interval. • Cliffs—Not specifically addressed. • Caves—Not specifically addressed. • Talus Slopes—Not specifically addressed.
Open habitat	• 20-acre maximum clearcut for tractor yarding; 30-acre maximum for cable yarding; openings separated by units at least as large as harvest unit or 20 acres, whichever is less, and separated by 300 feet in all directions.	• At least 5% of land base classified as forest opening at all times. • Prairie soil types will remain as grasslands while timber soil types converted to grasslands will be replanted with conifers.
Grazing	• Not specifically addressed.	• Grazing leases to occur in association with existing ranches. • Maximum of 1,000 head at any one time in Project Area.
Herbicide use	• Not specifically addressed.	• Not specifically addressed.

Issue	California FPR[1/]	PALCO SYP/HCP[2/]
Connectivity of LSH and riparian habitats	• See LSH management above.	• LSH connectivity maintained along riparian corridors (see riparian and wetland section).
Amphibians/Reptiles	• Not specifically addressed.	• Impacts minimized and mitigated through protection of riparian habitats, including large woody debris retention, instream habitat improvements, and sediment reduction measures. • Monitoring for the habitat of these species will occur through the aquatics and amphibian/reptile monitoring strategies which are designed to measure key habitat features such as temperature, embeddedness, and large woody debris.
Marbled Murrelet	• CDFG is consulted during THP preparation to determine if take would occur. Authorization required under Section 2081 of Fish and Game Guidelines for Consultation if take would occur.	• Vegetative buffers for suitable habitat on public preserves: – 300-foot buffer from suitable nesting habitat along Humboldt Redwoods State Park / PALCO boundary, and along Highway 36. – Within buffers, only late-seral silvicultural prescription allowed. – No additional buffering required within MMCAs. – Additional buffers along south edge of Headwaters Reserve. • Seasonal restrictions adjacent to suitable nesting habitat: – Seasonal restriction on timber operations (e.g., falling, bucking, yarding, log loading) within 0.25 mile of suitable nesting habitat, from 24 March to 15 September. – No restrictions on use and maintenance of existing roads. – Other exceptions may be approved through consultation with FWS and CDFG. – No seasonal restrictions required to protect breeding murrelets within MMCAs for covered activities outside of MMCAs. To the greatest extent feasible, activities with potential for disturbance within MMCAs shall be conducted outside of the murrelet breeding season. • MMCAs: – Management objectives include (1) maintenance of suitable nesting habitat, (2) recruitment of nesting habitat in residual old growth stands, and (3) buffering of suitable and recruitment by young growth stands. – No harvest or salvage of old growth stand components. – Thinning of residual stand components allowable only for enhanced recruitment of second-growth trees into residual overstory. Activities shall occur outside of the nesting season, with no new road construction, and no helicopter yarding. – Thinning of second-growth stands allowable only to accelerate development into mature condition. Activities shall occur outside of the nesting season, with no new road construction, and no helicopter yarding. – Use, maintenance, armoring, and decommissioning of existing roads shall occur to the greatest extent feasible outside the marbled murrelet breeding season. – Review all activities proposed within MMCAs, and within 0.25 mile of MMCAs, and within 0.25 mile of occupied stands, to ensure that disturbance of murrelets in MMCAs has been minimized to the greatest extent feasible. Checklist will be established for documentation. – Establish process for delineation of boundaries of MMCAs and conditions within MMCAs within first year of permit. Use aerial photos, written descriptions, and where feasible, GPS points to describe boundaries. Prepare videos of conditions along all roads within MMCAs. When THPs are proposed in stands contiguous with MMCAs, conduct formal surveys to establish boundaries prior to harvest. – Establish rating process for residual and old growth stands that have not been surveyed to protocol, using factors such as proximity to occupied stands, canopy closure, stems per acre, volume per acre, and stand size. Field measurements such as platform availability and surveys are not required in this process. The rating will divide those stands into 2 equal groups by acreage. The group with poorer habitat rating may be harvested without other restrictions related to murrelets, except for inclusion in the prioritization process described below. The group with the better habitat rating will be subject to the take minimization process and the prioritization process described below. – To minimize take of nesting murrelets, eggs, and young, in the stands rated as better habitat in the above process, and in the occupied stands authorized for harvest, operations associated with falling will occur outside the breeding season. – For old-growth and residual redwood authorized for harvest, conduct prioritization process for harvest. Overlay other constraints (e.g., inner gorge, mass wasting, etc.) to identify acreage tentatively available for harvest in short-term. To this acreage, apply prioritization of murrelet habitat, using factors such as existing survey results, proximity to MMCAs and other occupied habitat, canopy closure, stems per acre, volume per acre, and stand size.
		– Establish effectiveness monitoring process, with objectives of documenting continuing use of MMCAs and Humboldt bioregion by murrelets, status of population offshore of bioregion, and habitat conditions in bioregion. Process will proceed according to recommendations of scientific panel and agencies.

Table M-2. Management Requirements for Non-Federal Lands That Provide Protection for Various Wildlife Resources in the Project Area

<table>
<tr><th>Issue</th><th>California FPR[1/]</th><th>PALCO SYP/HCP[2/]</th></tr>
<tr><td></td><td></td><td>– Establish research fund to provide funding for research into conservation needs of marbled murrelet. Funding will be applied according to recommendations of scientific panel and agencies, with addition of one member of MMRT. Funding may be applied to projects within MMCZ 4 and 5.
• Rock and gravel mining at existing quarry in Allen Creek MMCA allowable.
• Establishment of two designated borrow pits within each MMCA, with a maximum of four acres of clearing within each MMCA over the life of the permit (includes removal of trees over 12 inches dbh where reasonably necessary).
• Fuel removal limited to within old growth residual stands and second-growth stands with prior written permission of FWS and CDFG.
• Fire suppression in accordance with a fire management plan.
• Stream enhancement projects with prior written concurrence of the wildlife agencies.
• Fish releases authorized by NMFS.
• Hunting allowed during September 16 – March 23 as otherwise authorized by regulation (outside of marbled murrelet nesting season).</td></tr>
<tr><td>Northern Spotted Owl</td><td>• Follow one of six procedures identified in FPR which include providing information to be used by Director to evaluate whether or not proposed activity would result in “Take” of an individual northern spotted owl. Maintaining the following conditions identified in FPR may avoid “Take”:
- No timber operations within 500 feet of nest or pair activity center during breeding season.
- Retain roosting habitat within 500 to 1,000 feet of nest or pair activity center.
- 500 acres of owl habitat retained within 0.7-mile radius of a nest or pair activity center; less than 50% under operations in any one year.
- 1,336 acres of owl habitat retained within 1.3-mile radius of a nest or pair activity center.
- Retained areas should conform to natural landscape.</td><td>• Management Objectives:
– Retain a minimum of 108 activity sites each year over the life of the HCP.
– Maintain NSO pairs on an average of 80% of the activity sites on the ownership.
– Maintain an average reproductive rate of at least 0.61 fledged young per pair.
– During the initial five years of the HCP, maintain and document the following minimum number of activity sites:
<table>
<tr><th>Years After Permit Issuance</th><th>Minimum Number Activity Sites</th></tr>
<tr><td>1</td><td>145</td></tr>
<tr><td>2</td><td>135</td></tr>
<tr><td>3</td><td>125</td></tr>
<tr><td>4</td><td>115</td></tr>
<tr><td>5</td><td>108</td></tr>
</table>
• Conservation Measures
– Establish a Scientific Advisory Panel, in collaboration with the FWS and CDFG. This panel will review and make recommendations for monitoring techniques, offer expert review of monitoring results, and make recommendations to PALCO on habitat retention standards for maintenance and recruitment of NSO activity sites. This panel will be convened, at a minimum, in years 1, 6, and 11 following issuance of The Incidental Take Permit.
– Conduct complete annual censuses to monitor all activity sites on the ownership and determine numbers of pairs and reproductive rates. PALCO may use a sampling methodology, rather than a complete census, provided the sampling proposal has been reviewed by the Scientific Advisory Panel and approved by FWS and CDFG.
– PALCO shall select and identify to FWS and CDFG before June 1 each year at least 80 activity sites which will be maintained using the following habitat retention guidelines (referred to as Level One Protection)
1. For activity sites where the NSO status has been determined to be nesting; or until a wildlife biologist determines that nesting has failed, or that young are capable of avoiding direct impacts of timber harvest (e.g., young are capable of sustained flight or can take live prey independently), no harvesting shall occur during the breeding season (March 1 through August 31) within a 1,000-foot radius of the nest tree.
2. Within 500 feet of the activity center the characteristics of suitable nesting habitat, if present, must be maintained. No timber operations, including salvage, shall be conducted in this area during the breeding season unless approved by the FWS and CDFG. Timber operations may be conducted in this area outside the breeding season if appropriate measures are adopted to protect suitable nesting habitat.
3. Within 500-1000 feet of the activity center, retain sufficient functional characteristics to support roosting and provide protection from predation and storms.
4. 500 acres of suitable NSO habitat must be provided, if present, within 0.7 mile of the activity center. Less than 50% of the retained habitat shall be under operation in any one year. If less than 500 acres of suitable NSO habitat are present, the acreage shall not be reduced. The 500 acres includes the habitat retained in subsections 2 and 3 above and should be as contiguous as possible.</td></tr>
<tr><td></td><td></td><td>5. 1336 total acres of NSO habitat must be provided within 1.3 miles of each activity site. If less than 1336 acres of suitable NSO habitat are present, the acreage shall not be reduced.
6. The shape of the areas established for habitat retention objectives shall be adjusted to conform to natural landscape attributes such as draws and stream courses while retaining the total area required.</td></tr>
</table>

Issue	California FPR[1/]	PALCO SYP/HCP[2/]
		– At activity sites which have not been designated for Level One protection, PALCO shall apply Level Two protection measures as follow: – For activity sites where the NSO status has been determined to be nesting; or until a wildlife biologist determines that nesting has failed, or that young are capable of avoiding direct impacts of timber harvest, no harvesting will occur during the breeding season (March 1 through August 31) within a 1000-foot radius of the nest tree. Following the breeding season, 18 acres around the activity site will be maintained as functional nesting habitat. The protected 18 acres will conform to natural landscape features, and the buffer protecting the activity site must be at least 400 feet wide. – For activity sites which have been determined to be occupied by a non-nesting pair or single NSO, 18 acres around the activity site will be maintained as functional nesting habitat. The protected 18 acres will conform to natural landscape features, as designated by PALCO's wildlife biologist, and the buffer protecting the activity site must be at least 400 feet wide. Harvesting may occur during the breeding season, at PALCO's discretion, adjoining the 18-acre habitat retention area. • Adaptive Management – PALCO is encouraged to conduct research to identify alternative activity site retention models for long-term management through the permit period. After five years, or at any later date during the permit period, PALCO may present for review by the Scientific Advisory Panel, alternative activity site retention models for use in management for the remainder of the HCP. Alternative activity site retention models shall not be implemented until they have been reviewed and approved by the FWS and CDFG. – PALCO may use these models to manage for recruitment of suitable habitat and potential establishment of new activity sites. Historic activity sites may then be harvested, outside of the breeding season, consistent with attainment of the management objectives. – PALCO, FWS or DFG may at any time propose modifications to the characterizations of NSO suitable habitat provided in Definition 3e (see Appendix P). Proposals shall be validated against any relevant data including that collected in the performance of Conservation Measure 4b (see Appendix P). The Scientific Advisory Panel shall review applicable information and provide a recommendation to PALCO, FWS, and DFG, who shall mutually agree upon any modifications. – Management objectives may be modified if new information becomes available following review of the Scientific Advisory Panel and approval by FWS and CDFG. – The seasonal bounds and duration of the prohibition on harvesting adjacent to activity sites may be modified based upon ownership specific information provided at PALCO's discretion after review by the Scientific Advisory Panel and approval by FWS and CDFG. – The actual or estimated number of activity sites shall remain at or above the management objectives provided above for each year of the HCP. If the applicable management objective is not achieved for any year of Plan operations, or if, for any reason PALCO is unable to accomplish conservation measure 4d (see Appendix P), PALCO will convene the Scientific Advisory Panel for a joint meeting with FWS and CDFG to review potential reasons why the objectives are not being met and potential corrective measures to implement. Following this consultation, FWS and CDFG shall determine which conservation measures shall be modified, including the potential implementation of no-take management procedures. – Proportions of activity sites occupied by pairs and reproductive rates will be averaged over running five-year periods. If the five-year average for either parameter does not meet the management objective, PALCO will convene the Scientific Advisory Panel for a joint meeting with FWS and CDFG to review potential reasons why the objectives are not being met and potential corrective measures to implement. Following this consultation FWS and CDFG shall determine which, if any, modifications may be required for conservation measures 4b, 4c, 4d, or 4e (see Appendix P). – Management objective 2a and Conservation Measure 4d (see Appendix P) may be modified commensurate with changes in size of ownership following review by the Scientific Advisory Panel and approval by the FWS and CDFG. Modifications to this management objective, based upon size of the ownership and scope of incidental take coverage extended by FWS and CDFG may be proposed either by PALCO or the wildlife agencies.

Table M-2. Management Requirements for Non-Federal Lands That Provide Protection for Various Wildlife Resources in the Project Area

Issue	California FPR[1/]	PALCO SYP/HCP[2/]
Western snowy plover		• Active nests: a 1000-foot seasonal buffer will be applied until the end of the breeding season (March 15 – September 15) or until nest failure or completion • Nests will be protected while operations and monitoring continue • Monitoring will occur through bird surveys on gravel bars
Peregrine falcon	• Minimum 10-acre buffer zone around active nests; special cutting prescriptions may be required by the Director up to 10 acres in size. • The critical period is February 1 until April 1 for active nests, and is extended until July 15 for occupied nests. During the critical period, no timber operations are permitted within the buffer zone, except for hauling on existing roads that normally receive use during this period within the buffer zone, and where peregrines have shown a tolerance for this activity. • Helicopter yarding is prohibited within one-half mile of the nest.	• Management Objective – Implement nest site identification and protection measures which have a high probability of providing for successful nesting of peregrine falcons. • Conservation Measures – Surveys 1. Surveys of potential nesting habitat shall be conducted within THP areas and within 0.5 mile of their boundaries if operations will occur during the breeding season (January 15 - August 15). This distance shall be increased to 1 mile for projects involving blasting or pile driving activities. Surveys shall follow the guidelines in Pagel (1992), Protocol for Observing Known and Potential Peregrine Falcon Eyries in the Pacific Northwest, any year operations will occur. 2. Field personnel shall be trained to recognize peregrines and potential nesting habitat. 3. Documentation (i.e., survey forms and written summary) of field surveys performed for THPS shall be provided to FWS and DFG annually. – Nest Site Protection Measures 1. No trees within 500 feet of an active peregrine falcon nest shall be cut without prior consultation and concurrence from the FWS and CDFG. Timber operations shall not occur closer than 0.5 miles from occupied nests during the breeding season. This may be reduced where significant topographic features screen the nest from operations with prior consultation and concurrence from the FWS and CDFG. Blasting or pile driving activities shall not occur within 1.0 miles of occupied nests. Disturbance buffers may also be lifted through monitoring and a determination that the site is not occupied, that nesting is not occurring, has failed or that the young have fledged. Surveys shall follow the guidelines in Pagel (1992), Protocol for Observing Known and Potential Peregrine Falcon Eyries in the Pacific Northwest. • Monitoring – Nest sites for which buffers are established shall be monitored during the breeding season each year the THP is in effect and for at least one breeding season following completion of the plan. Annual reports describing monitoring efforts shall be provided to the FWS and CDFG. These reports shall disclose the dates of surveys, identity of surveyors, survey methods, and results (nest condition, occupancy rates, and nesting success).
Bald eagle	• Minimum 10-acre buffer zone around active nests; clear-cutting not allowed within the buffer zone; commercial thinning, salvage, selection, and shelterwood (except removal step) regeneration harvest prescriptions okay; all active nest trees, designated perch trees, screening trees and replacement trees shall be left. • Critical period is January 15 until either August 15 or four weeks after fledgling, as determined by the Director. During this critical period, no timber operations are allowed within the buffer zone. Exceptions for hauling on existing roads can be made by the Director.	• Management Objectives – Implement nest site identification and protection measures which have a high probability of providing for successful nesting of bald eagles – Minimize disturbance of foraging bald eagles • Conservation Measures – Surveys 1. Focused surveys for bald eagle nests shall be conducted for THPs located within 0.5 mile of Class I streams that provide potential foraging habitat. Potential nesting habitat within THP areas and out to 0.5 mile from their boundaries shall be surveyed during the breeding season immediately prior to the commencement of operations. Operations shall not commence until surveys have been completed. 2. To increase the probability of detecting any adult eagles nesting on the ownership, surveys for eagles and their nests shall be conducted between March 1 and April 15. Surveys shall consist of at least three site visits, one of which shall occur after April 1. Repeated float trips down Class I streams that provide potential foraging habitat, or surveys conducted by airplane or helicopter to search for adult birds and nests, may be necessary. 3. If bald eagles are observed during surveys, additional visits shall be conducted to determine if eagles are nesting within a THP area or within 0.5 mile of its boundary. This determination may be aided by observing the eagle's behavior, location, and direction of flight. Plan operations shall not commence until surveys have been completed and the results of any positive surveys have been reviewed and approved by the FWS and CDFG.

Issue	California FPR[1/]	PALCO SYP/HCP[2/]
	• Helicopter yarding within one-quarter-mile radius of the nest tree is prohibited; gradual approach is allowed within one-quarter and one-half-mile radius.	4. Field personnel shall be trained to recognize bald eagle nests and other signs indicating their presence. Although most bald eagle nests are likely to occur within 0.5 miles of suitable foraging habitat, they could potentially occur anywhere on the Plan area where nesting habitat is suitable. Therefore, all THPs shall be evaluated for the existence of suitable nesting habitat and localized searches for nests and eagles shall be conducted if necessary. 5. Documentation (i.e., survey forms and written summary) of field surveys performed for THPs shall be provided to FWS and CDFG annually. – Nest Site Protection Measures 1. Active nest trees shall be defined as a tree used by bald eagles for nesting at least once within the previous five years. If inadequate data exists to document the status of individual nests, they shall be considered to be active. Occupied nests shall be defined as nests currently being used by bald eagles for reproduction. This shall include territorial behavior by one or more adults in the vicinity of a known nest, nest construction, egg laying, incubation, or rearing of young. 2. No trees within 500 feet of an active bald eagle nest shall be cut without prior consultation and concurrence from the FWS and CDFG. Timber operations shall not occur closer than 0.5 miles from occupied nests during the breeding season. Disturbance buffers may be modified with consultation and concurrence by FWS and DFG based upon topographic and other site-specific and project specific circumstances. Disturbance buffers may also be lifted through monitoring and a determination that the site is not occupied, that nesting is not occurring, has failed or that the young have fledged. Blasting or pile driving activities shall not occur within 1.0 miles of occupied nests. – Mitigation for Disturbance of Foraging Eagles 1. Skyline cables over Class I streams shall be marked to reduce the possibility of collisions when operating in or adjacent to known bald eagle foraging habitat. 2. Winter foraging by bald eagles on the PALCO ownership is currently very uncommon. Implementation of the aquatic strategy specifically measures to reduce disturbance in the channel migration zones and Class I RMZs and restrictions on winter use, construction, reconstruction, and stormproofing of roads are expected to effectively minimize the potential for disturbance. • Monitoring – Nest sites for which buffers are established shall be monitored during the breeding season each year the THP is in effect and for at least one breeding season following completion of the plan. Annual reports describing monitoring efforts shall be provided to the FWS and CDFG. These reports shall disclose the dates of surveys, identity of surveyors, survey methods, and results (nest condition, occupancy rates, and nesting success). – At five-year intervals, PALCO, FWS, and CDFG shall meet to review the results of monitoring activities, evaluate implementation and effectiveness of measures, and evaluate potential procedural improvements.
Bank swallow		• PALCO shall attempt to prevent bank swallows from nesting in stock-piled sand associated with in-stream mining operations using netting or other means developed in consultation with FWS and DFG. • Nesting colonies along watercourses avoided during May and June. Establish a 200-foot buffer around active colonies during the nesting season, or develop alternative mitigation measures. • Where new road construction crossing low gradient Class I stream is planned, PALCO shall survey the proposed alignment once in May and once in June to identify any nest colonies within 200 feet of the construction area. If nest colonies are found, PALCO shall consult with FWS and CDFG to jointly develop measures which will maintain the nest colony.
California red tree vole and Pacific fisher		• Likely that aquatics conservation strategy, in combination with spotted owl conservation strategy, and snag retention and recruitment strategy will produce a mosaic of habitat suitable for maintaining populations. • Monitoring to occur through inventory of forest seral types, snags and downed logs, and riparian buffers.

[1/] PALCO currently follows FPR and a Spotted Owl Resource Plan (SORP). Under PALCO's SORP, no harvest is allowed within 500 feet of nest sites, roosting habitat is to be retained within 1,000 feet of a nest or activity center, and no harvest is allowed within 1,000 of an active nest during breeding season.
[2/] See the HCP, Part 3, Section B, Appendix P, for complete details of the conservation measures and monitoring plans under the Marbled Murrelet Conservation Strategy and Part 2, Section C, for the Northern Spotted Owl Conservation Strategy in their entirety. Only key provisions are described here.
SOURCE: FPR and PALCO, 1998.

Table M-3. Current (Year 0) and Projected Acreage of LSH and Interior LSH Among Various Patch Size Classes in the Project Area Under the Proposed Alternatives

Habitat	Patch Size Class (Acres)	Current	Alternative 1		Alternative 2		Alternative 2a		Alternative 3		Alternative 4	
		Year 0	Year 10	Year 50	Year 10	Year 50	Year 10	Year 50	Year 10	Year 50	Year 10	Year 50
LSH	**0 - 19**	3,216	3,356	5,176	3,581	4,631	3,659	4,656	3,317	3,226	3,670	4,226
	20 - 79	6,344	4,399	6,604	5,323	5,570	5,231	5,524	6,143	4,873	5,411	6,509
	80 - 1000	23,108	19,355	19,184	18,127	10,427	18,458	10,715	26,753	16,787	18,120	11,851
	> 1000	35,806	19,426	7,032	16,777	8,816	16,187	8,570	35,099	72,933	26,344	32,450
Total LSH	**Acres**	68,474	46,537	37,996	43,808	29,444	43,535	29,465	71,312	97,819	53,545	55,036
Interior LSH	**0 - 19**	1,272	891	172	780	240	811	263	1,190	1,551	924	704
	20 - 79	2,936	1,423	373	1,244	338	1,330	338	2,442	3,094	1,916	1,215
	80 - 1000	9,522	3,320	1,511	3,867	2,240	3,616	2,238	8,546	16,935	5,734	4,516
	> 1000	6,281	5,219	2,559	5,169	3,488	5,457	2,568	6,653	9,573	6,726	12,912
Total Interior LSH	**Acres**	20,011	10,853	4,615	11,060	6,306	11,214	5,407	18,831	31,153	15,300	19,347

Source: Foster Wheeler Environmental Corporation

Table M-4. Classification and Definitions of Spotted Owl Habitat

Spotted Owl Habitat Type	WHR Codes [1/]	Definition [1/]
High-Quality Nesting Habitat	DFR5_D, DFR5_M, DFR5AD, DFR5AM, DFR6_D, MHC5_D, MHC5AD, MHC5BD, MHC6_D, MHW5_D, MHW6_D, RDW4AD, RDW4BD, RDW4CD, RDW5_D, RDW5_M, RDW5AD, RDW5AM, RDW5BD, RDW5BM, RDW6_D, DFR5BD, DFR5BM, MHW5AM, MHW5AP, MHW5AS	Douglas-fir, montane hardwood-conifer, and montane hardwood forest types with $\geq$ 24” dbh and $\geq$ 40% tree canopy closure; redwood type with $\geq$ 11” dbh and $\geq$ 40% tree canopy closure
Mid-Quality Nesting Habitat	MHC5_M, MHC5AM, MHC5BM, MHW5_M, RDW4AM, RDW4CM	Montane hardwood-conifer and montane hardwood types with $\geq$ 24” dbh (but not multi-layered) and moderate tree canopy closure (40 – 60%); redwood type 11-24” dbh and moderate canopy closure (40 – 60%)
Low-Quality Nesting Habitat	Too many codes to list here. See Table I-3 for WHR codes that create this item.	Douglas-fir, redwood, montane hardwood, and montane hardwood-conifer between 11-24” dbh with canopy closure <40%
Roosting Habitat	DFR3_D, DFR3_M, DFR3_P, DFR3_S, MHC2_D, MHC3_D, MHC3_M, MHC4AP, MHC4BP, MHC4CP, MHW2_D, MHW2_M, MHW3_D, MHW3_M, MHW4AP, MHW4AS, MHW4BP, MHW4BS, MHW4CP, MHW4CM	Douglas-fir type between 6-11”dbh with any canopy closure; montane hardwood-conifer between 1-6”dbh with dense canopy closure, and between 6-11” dbh with moderate to dense canopy closure, and between 11-24” dbh with open cover; montane hardwood between 1-11” dbh with moderate to dense canopy closure, and between 11-24” dbh with sparse or open cover
Foraging Habitat	DFR2_D, DFR2_M, RDW2_D, RDW2_M, RDW2_P, RDW2_S, RDWS_P, RDW3_S,	Douglas-fir type between 1-6” dbh with canopy closure >= 40%; redwood type between 1-6” dbh with any canopy closure, and between 6-11” dbh with canopy closure <40%
Non-habitat	All other WHR codes	Most habitat types in seedling stage.

1/ See Appendix TableL-1 (adapted from PALCO’s HCP/SYP) for a crosswalk and definitions of WHR vegetation codes.

Source: Foster Wheeler Environmental Corporation

Table M-5. Current (Year 0) and Projected Acres of Northern Spotted Owl Habitat in the Project Area Under the Proposed Alternatives [1/]

		Alternative 1		Alternative 2		Alternative 2b		Alternative 3		Alternative 4	
Habitat Type	Year 0	Year 10	Year 50	Year 10	Year 50	Year 10	Year 50	Year 10	Year 50	Year 10	Year 50
High Quality Nesting Habitat	80,717	71,432	79,664	64,160	58,647	63,887	58,490	88,368	140,707	75,019	92,799
Mid-Quality Nesting Habitat	12,390	11,660	1,623	14,747	1,955	14,773	2,068	11,959	1,556	12,043	1,263
Total Suitable Nesting Habitat	93,107	83,092	81,287	78,907	60,602	78,660	60,558	100,327	142,263	87,062	94,062
Low Quality Nesting Habitat	70,694	59,284	78,215	57,501	105,214	57,434	103,355	63,059	65,729	58,527	83,068
Roosting Habitat	10,144	26,985	8,432	26,720	11,074	26,733	13,593	28,203	10	26,323	12,786
Foraging Habitat	23,488	14,290	11,382	14,730	9,337	14,730	3,943	13,888	0	13,956	7,053
Non-habitat	21,869	35,552	39,887	41,347	32,978	41,648	37,757	13,728	11,204	33,336	22,236
Total Unsuitable Nesting Habitat	126,195	136,111	137,916	140,298	158,603	140,545	158,648	118,878	76,943	132,142	125,143
Total Acres	**219,302**	**219,203**	**219,203**	**219,205**	**219,205**	**219,205**	**219,206**	**219,205**	**219,206**	**219,204**	**219,205**

1/ Suitable nesting habitat was restricted to mid- and high-quality nesting (see text for more details).

Source: Foster Wheeler Environmental Corporation